



## THE PROBLEM OF FINANCING INNOVATION ACTIVITY IN RUSSIA

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### Introduction

The general aim of this paper is to identify the role and significance of the innovation activity as effective instruments of economic development and structural change. The role and significance of the scientific-and-technological advance, innovation activity and generation of new knowledge as effective instruments of development and sustainable functioning of national economies and single branches, the postindustrial society generally, established completely at the beginning of the XXI century.

The modern stage of economical development of Russia characterizes with strengthening attention on problems of innovative activity in all branches and spheres of economy. Owing to exhaustion of model of catching up development Russia faced ambitious problem of transition to trajectory of system modernization and innovative development.

Such transition of Russia to the innovation way of development is one of the most important priorities for governmental policy.

Goals and directions of Russian state innovative policy:

- development and improvement of regulatory basis for innovative activity and mechanisms of its stimulation;
- creation of system supporting innovation activity, development of production, enhancing competitiveness and export of science intensive;
- development of innovative infrastructure, including dataware system, examination system, financial and economic system, system of developments' certification and promotion and etc.;
- reforming science organization and restructuring of production;
- raising of economic subjects' competitiveness;
- development of small innovative business.

Meeting this goal will make it possible to achieve national strategic priorities, namely improvement of the quality of life for the population of Russia and creating knowledge-based economy.

Such transition is the most important when our country in value of the integral competitiveness index still takes place in the fourth ten of the world countries and the share of high-technology products in merchandise export and the number of innovation enterprises comes only to 10-12% of the total, share of expenses for researches and development in GNP are less than 1 % [1].

Overcoming the technological gap of Russia demands accelerated formation of national innovation system which should provide effective interaction of different structures (state,

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private and corporate ones) conducting scientific researches and creating new technologies. Considering the reforms which are carrying out in Russia such system must be created again in fact. In this connection interest to factors and parameters describing scale and dynamics of innovative activities in Russia is substantiated.

Object of research of this article is innovative activity in scales of all Russian economy, subject of research is problems of its financing.

We consider innovative activity, on the one hand, as the activity directed on commercialization of cumulative knowledge, technologies and equipment which result are new goods and services, on another hand, as all activity within the limits of innovative process, and also marketing researches of commodity markets and search of new consumers, dataware of possible competitive environment and consumer properties of rival firms goods, searches of innovative ideas and decisions; adoption partners and financing of the innovative project.

Innovative process and its management begins directly with the stage of carrying out of research works. During the works theoretical ideas are put forward, experiments are carried out. Financing of such works can be conducted within the limits of state programs, from state budget and on non-repayable basis. In the article we analyze the results of innovative policy already spent by the government of Russian Federation.

Specificity of innovation as a new product and as a item sold in a market, is defined by the following: high degree of uncertainty at receiving of final scientific and technical result or service; the special pattern of financing connected with risk of time break between expenses for creation of innovation and incomes, received as the result of its realization; uncertain pattern of demand by virtue of what offer of innovations should play an active and anticipatory role. Incentive motives to creation and offering of innovations generally is necessary to divide into external motives of innovative activity which are caused by economic policy of the state and into internal motives of innovative activity which are connected with interests of production competitiveness increase let out by enterprises.

The main hypothesis of work is a precise comprehension of innovative activity strengthening necessity in conditions of insufficient degree of russian economic agents motivation. In conditions of a favorable conjuncture in the market of raw materials russian enterprises receive sufficient volume of profit without carrying out of expensive scientific researches and development of innovations. Therefore the main task for today is introduction of the program of innovative activity activization based on partnership of state and private capital.

The paper is structured as follows. The first section introduces the theoretical approach of innovation. The second part is devoted to the analysis of statistical data on scales and dynamics of innovative activity in Russia for years of reforms, and to the problems of financing of scientific researches with innovative orientation. Finally, the third section concludes remarks and policy issues.

## **1. Theoretical bases of innovations**

For last 50 years economic theory has passed a complicated way from the description of businessman, firm and state as separate elements of innovative process to their consideration as interconnected parts of complex system which work is provided with the certain set of institutional factors.

At the same time the science as the main source of innovations is not closed, limited by walls of universities and scientific centers system, but it is built integrally into economic processes occuring within the limits of national states, in branches of facilities, large corporations and small business.

The concept of national innovative systems (NIS) was developed in 1980th years practically simultaneously by a big group of authors. B.Lundvall (professor of University Uppsala, Sweden), K.Frimen, ( professor, founder of the Center of studying of scientific policy

at Sussex university, Great Britain), R.Nelson (professor of Colombian university, USA) became leaders of this direction .

They adhered to the general methodological principles:

- following I.Shumpeters ideas of competition on basis of innovations and scientific development in corporations as primary factors of economic dynamics;
- recognition of special role of knowledge in economic development;
- consideration of institutional context of innovative activity as the factor directly influencing its maintenance and structure.

I.Shumpeter was the first economist who has recognized limitation of the static theory of general balance. He has drawn attention to deep reasons and mechanisms of development of economy. Firstly, it is a competition based on innovations which main source is a research activity of large corporations. It leads subsequently to " creative destruction " of developed branches and markets. Secondly, creativity of person, innovator and businessman, capable to embody new ideas into effective economic decisions. Shumpeter also widely used evolutionary approach, developing N.Kondratyev's ideas of long business cycles. For the modern theory of innovative activity ideas of other great economist of XX century - F.Hayek, in particular, his concept of " the absent-minded knowledge " are exclusively important: representation of competitive market as a special information system which reveals, uses and coordinates various types of knowledge of millions people independent from each other, and also raising the question of principle limitation of many mechanisms of purposeful regulation in this field. He was one of the first who analysed specific features of economic development - uncertainty, limitation of information, imperfection of knowledge, that is the basis of innovative process. These positions formulated by Hayek outside of a direct connection with analysis of innovative activity, are represented as the basis for understanding of such phenomena as the economy which is based on knowledge, and, that's even more important, learning economy, training, or creative corporation. The third part of the concept of innovative systems are the problems of institutional context of innovative activity which were most consistently developed in D.Nort's works. Distinctive feature of its analysis is paying a special attention to interaction of institutional structures and technologies, their common role in economic and social development. The main idea consists in directly and indirectly influence of institutes on knowledge and on technology. D. Nort shows, that during evolution of institutional systems in developed countries were created branched out conventional attitudes and mechanisms providing higher efficiency of markets and rather lower transaction costs, than in the countries of " the third world ". It promotes competitions which are based on new knowledge and technologies, instead of search of various rents or ways of national wealth redistribution.

Integration of the named fundamental preconditions into concepts of innovative systems gives a new key to research mechanisms of economy self-development. In recent years the concept of innovative systems is widely used by the analytical centers of developed countries and international organizations for studying economic problems of science and technical progress, development of offers on stimulation of development of " new economy ". National innovative system (NIS) is a set of interconnected organizations (structures) occupied by manufacture and commercial realization of scientific knowledge and technologies within the limits of national borders, (small and large companies, universities, state laboratories, technoparks and incubators). At the same time NIS is a complex of institutes of legal, financial and social character providing innovative processes and having strong national "roots", traditions, political and cultural peculiarities.

Innovative system is being formed under influence of set of objective factors for each country, including its sizes, presence natural and manpower, features of historical development of institutes of a state and forms of enterprise activity.

These factors act as long-term determinants of direction and speed of evolution of innovative activity. Besides each innovative system is characterized by certain structure and

some degree of orderliness, assuming sufficient stability of institutional interactions (every country has its own national configuration of institutional elements).

The most simple model describing interaction of innovative system elements, shows, that the role of private sector consists in development of technologies is on the basis of own researches and in market development of innovations, role of the state - in assistance to manufacture of fundamental knowledge (in universities) and complex of technologies of strategic (military) character, and also in creation of infrastructure and favorable institutional conditions for innovative activity of private companies. Within the limits of this general model of national features of innovative systems are formed: greater or smaller role of a state and a private sector in performance of specified functions; relative value of large and small business; correlation of fundamental and applied researches and development; dynamics of development and branch structure of innovative activity.

Scientific and technical progress is defined by efficiency of two complementary components : scientific and technical achievements and innovations. In the first case results scientific and technical progress are new knowledge, new inventions, new technologies which turn out as a result of development which are the kernel of fundamental researches.

In the second case the results of scientific and technical progress are innovations - professional purposeful development and finishing of accumulated knowledge, inventions, technologies in form of goods, services, systems, equipment, industrial complexes, their effective usage, and if necessary reception of new theoretical achievements. It brings to growth of production volume and services defining by well-being of society. During the different historical periods, in various economic situations it is necessary for society to define optimum quantity of resources distribution of society between priority of theoretical achievements and priority of theoretical innovations.

We suppose, and historical experience confirms, that during structural transformations of economy, crisis periods, periods of restoration and revival of economy preference should be given to theoretical innovations. Such approach allows to receive fast economic results leading to investments and to innovative-investment growth of well-being of society.

Volume and dynamics of innovative activity are defined by parameters of innovative cycle which characterizes the period of time from the beginning of development up to completion its practical use.

Innovation process in general is a closed two-path cycle. It enables to produce and sell high technology products due to practical implementation of high technologies created as a result of fundamental and applied research (figure 1).

Interaction of various stages of unified scientifically-reproduction cycle is typical for innovative type of development: science - manufacture - market - consumption in their certain sequence and proportional correlation for satisfaction of constantly varying solvent demands.

In modern conditions innovative activity gets new quality and efficiency, as well as an opportunity of realization, are defined by set of straight and return lines between various stages of innovative cycle, and between manufacturers and consumers of knowledge, subjects of managing, market and state not only within limits of national borders, but also on a global scale.

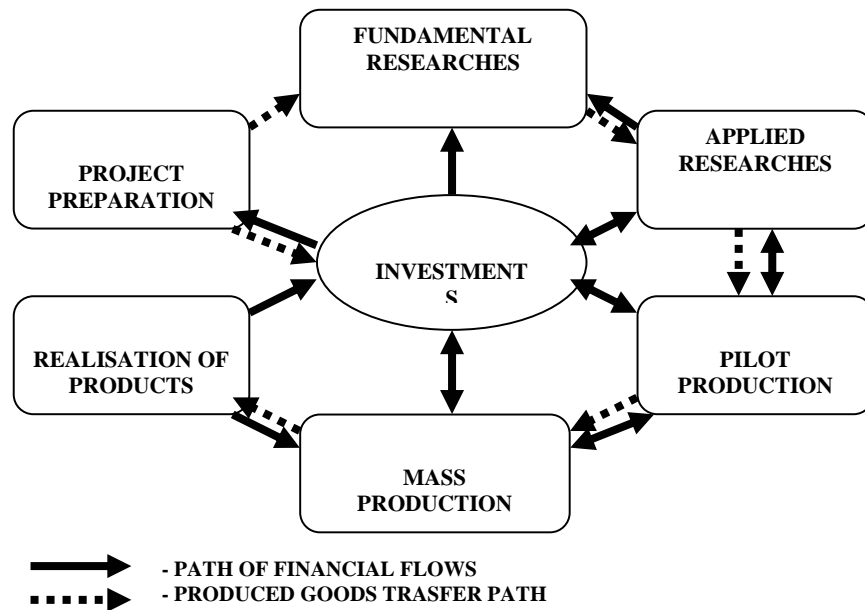


Figure 1. Generalized resource-produce cycle of innovation process

The system of the interconnected indicators characterizing its basic spheres is developed for definition of scale and dynamics of growth of innovative economy based on knowledge: science, innovations, intellectual services, education:

- share of expenses for researches and development in GNP;
- structure of expenses on researches and development on stages of scientific researches;
- number occupied in sphere of science and high technologies;
- relative density of hi-tech sector of economy in manufacturing industry and services production;
- share of hi-tech production in barter between countries, export of high technology products; contribution of ICT sector to growth of number of workplaces and employment;
- share of investments into sector ICT and their contribution to labor productivity growth;
- volume of investments into sector of knowledge (public and private), including expenses on higher education and its research sector, and also investments into software developing;
- share of participation of corporate capital in financing of researches and developing;
- volume and structure of the venture capital keeping while the leading part as a source of financing of sector ICT;
- cooperation degree between corporations, venture firms, scientific organizations and universities, international cooperation in a science field science and innovations;
- efficiency indicators of international exchange by results of inventive activity;
- share of scientists and engineers of high qualification, and also number of students, leaving to study in other countries [2].

Proceeding from the offered set of parameters, we will try to show on the theory of statistical and fact bases the share of innovative economy in scientifically-economic complex of our country, scales of innovative activity and problem of its financial provision in Russia in comparison where it's possible, with developed countries.

## **2. Aanalysis of scales and dynamics of innovative activity and ways of its financing. World experience and Russian specificity of innovative activity.**

The period of the economic transformations of 1990-es accompanied with sharp drop in production and solvent demand on the background of high inflation's rate, was signified by steady fall of innovation activity level. If at the end of 1980-es specific gravity of enterprises which developed and applied new or advanced products and technological processes in domestic industry of former USSR varied within 60-70%, at the beginning of 1990-es this rank has already fallen more then three times. In 1992-94-es specific gravity of innovation-active enterprises did not exceed 20% of the total their numbers in industry [3].

The second peak of innovation activity level's reduction was in 1995 when this share has come to 5,6%. During the next two years it continued to decrease but not so significantly – up to 4,7% in 1997. Then firstly from the beginning of economic reforms some resuscitation of innovation activity in the industry had been observed: its level has formed 5% in 1998, 6,2% in 1999. For comparison we can mark that this value is approximately lower in 4-5 times than in Portugal (26%) and in Greece (29%), that are distinguished with minimum showings of innovation activity from the European Alliance countries, but the severance with leading states such as Netherlands (62%), Austria (67%), Germany (69%), Denmark (71%) and Ireland (74%), reaches 10-12 times [3].

In Europe in 2000 to create the most competitive and effective economy by 2010 the decision about formation of european scientific space was solved on the meeting of EU countries Council of Ministers. In 2002 the problem to direct for financing the scientific developments not less than 3% of Europe GDP by the end of decade was posed. Since January, 2007 EU has started the new program FP7 (7th Frame Program of ES), calculated to the period since 2007 till 2013 and targeted on support and development of the science and researches in the united space of the Euro-alliance member-countries. The Program FP7, with the total financing volume of the 54,582 million Euro, unites all research initiatives of the Euro-alliance and targeted on increasing of competitiveness of the European studies, educational and innovation spheres [4].

The necessary condition for successful operating of national innovation systems is developing fundamental scientific researches. Fundamental science is a matter of a great importance in creating efficient, breakthrough innovations that determine a long-term perspective of technological development not only for single companies and industries, but also for the national economy in general.

The analysis of scientific publications of the latest years gives all us reasons to suppose, that practically all Russian society understands necessity of scales expansion of innovative activity for all country's branches of facilities with the purpose of increase of Russian economy competitiveness and quality of life.

Starting point of Russian strategy in the field of sciences are "Bases of RF policy in the field of developments of the science and technology up to 2010 and the subsequent prospect", approved by President of Russian Federation in 2002. The tasks for Russia's transition to innovation way of the economy development, reduplication of GDP and essential increase of financing of Research and Advanced Development were put at this strategy [5]. However till now this understanding isn't realized in system of actions allowing significantly activate innovative activity in the country.

The problems of Russian science financing arouse anxiety. The situation is aggravated by the lack of the line "Innovation activity funding" in the Russian budget. Even the definition of the term "innovation activity" lacks precision. These facts cause considerable problems in financing of fundamental researches especially if they are directly connected with practical implementation.

General commercial credits are inaccessible for innovation teams and companies due to high innovation risks. Often their single asset is intellectual property as a patent or know-how. Therefore they have to look for other source of financing namely different non-trading funds and

grants, commercial venture funds, private investors' means, including foreign ones, and industrial companies. Different state funds created for special programs also make sizable contributions. The important financial subjects are the Foundation for Assistance to Small Innovative Enterprises, Russian Foundation for Basic Research, International Science and Technology Center, CRDF, TACIS, etc. [6]

This group which has a significant share in financing accumulates a huge array of documentation and considerably affects the development trends of Russian science. However, the amount of financing per announced project given by such foundations is not generally large. And the requirements imposed on the projects in terms of their commercial potential are also minimal. Moreover, most of the foundations do not declare their rights on the intellectual property achieved as a result of the financed project. This financial source is convenient to refer to at the initial stage of the commercial process as well as it enables to conduct a necessary minimum of the research (e. g. to manufacture the first prototype of the innovation product) and does not burden the inventor with unnecessary obligations.

Nowadays studying and implementing foreign experience in this field is a matter of great importance in Russia, first and foremost such programs as Link (Great Britain), TEMPUS / TACIS (EU), SBIR and STTR (the USA), IRAP (Canada) and others. [7]

There are enough ways of stimulation of innovative processes in world practice. One of stimulation ways is the legislative establishment of sizes of deductions on research and development of business structures. Experience of the most radical actions took place in history of Germany (the package of laws «Whip for the industry»). If to apply the similar approach in Russia and to give it legislative character the direction of 1-1,5 % of enterprises gain will allow to increase by financing of research and development and innovations in 2-3 times science financing. Other way, as a matter of fact “supplying”, was applied in Japan and consisted in active participation of the state in acquisition of technologies abroad. The third way - tax - has some directions: increase in taxes (it was applied across France where at the expense of VAT increase redistribution of the additional received expenses for education was carried out); creation of tax privileges is used in the US, and application of extreme tax privileges was put into practice in the form of an exception of taxable profit of investments in research and development in Australia (150 %) and in Singapore (200 %).

The comparison of the mechanisms of state support at the initial stages of commercializing scientific results in the developed countries points that patterns of transferring technologies from the academic sector to the industry differ country-to-country and are developed relying on the cultural, political and financial situation. What connects all the mechanisms is the government striving to create the most effective schemes of new knowledge assimilation and to give maximum support to the technology transferring services in certain scientific institutes.

### **3. Venture investment as a factor of innovative Russian economy development.**

Innovative way of development which have become for Russia by the core in modern economic conditions, forces to search for new approaches to realization of scientific and Russian economy technical potential. Substantially the decision of given problem depends on possibility and ability to use modern financial tools and mechanisms for attraction in hi-tech sphere of off-budget economy investments. One of the most perspective ways of realization high risk the high technology innovative projects is the venture investment which efficiency is confirmed by world practice.

Venture investment is an innovative activity development catalyst. An Institute of venture investments in developed countries represents the major source of off-budget financing of scientific researches, applied developing and innovative activity.

The basis of prompt development of venture investment, despite high investment risks and a big number of failures at creation and development of new companies, consists in high

indicators of efficiency of activity of venture funds. So, average world indicators of annual profit of funds make 17-25 %, that considerably exceeds indicators of bank profitability [10].

Speaking about venture investment, it is necessary to differentiate accurately venture and direct investments. Can be recognized by distinctive line of venture investment that this mechanism is used for financing of innovative enterprises of small and average business in many countries of the world. As to Russia, here operate, basically, funds of direct investments.

In Europe, as well as all over the world, the basic sources of resources of venture capital - approximately 2/3 from total amount of capitalization of funds - are banks, pension funds and insurance companies. In Russia initially basic resources have been given by European Bank of Reconstruction and Development, International Financial Corporation and other funds. The situation has changed a little after 2000 when structures with Russian by origin the capital began to be created. Venture funds finance research on the commercial basis, i. e. for the purpose of realizing a profit. They develop a limited number of researches and often specialize in a certain area of science and technology. According to some estimation, only one of the ten projects brings commercial advantage; the profit should pay for all the costs. Cooperation of inventors with these foundations provides a complete or partial transfer of the right to use the result of investigation to the financial part who can further resell it to another strategic investor. For today the share of Russian capital isn't more than 1,5 % that is not enough for Russia.

A number of venture funds are built and functions on the basis of Russian capital mostly by own companies means that finance R&D generally in order to implement them into production and enter the market with a new product. Today not even every sufficiently large Russian company can afford such financing.

Venture funds came up to Russia at the beginning of 90-es years. Before 1998 the amount of the fund stably increased. But as a result of August's default many companies controlling these funds failed. After 2000 the growing renewed. In 2005 there were about 80 investment institutes in Russia. General capitalization of the fund forms for present day more than 6 billion of the dollars. The share of Russian capital in these funds steadily grows (11, 22 and 40 % for period since 2004 till 2006). In 2006 Russian venture company (RVC) - so-called "fund of the fund" that is to say fund, financing whole spectrum of innovations was created. According to initial project authorized capital for 100 percents of state "fund of the fund" (in the form of public corporation formed 15 billions of rubles. This has allowed to create 8-12 venture fund with the volume since 50 up to 100 million dollars. Quotient investors will be put at their disposal up to 49 percents of assets at such fund, i.e. each company, recognized the winner of competitive selection must attract the quotient investments to the formed venture fund in volume of 51% from its total amount. Rest 49% of whole volume, presented for creation of venture fund, it will get from Russian venture company's facilities. The Maximum acquisition's amount of investment shares of the venture fund in the framework of the first competitive selection is 4,8 billion of rubles. The investment amount to separate venture fund in exchange for 49% from the whole investment amount will form from 600 millions of rubles up to 1,5 billions of rubles. Foreigners will also be admitted to control them. The main principles of the functioning RVC of Economic Development Ministry has borrowed from experience of project, realized by European bank of reconstructions and developments in middle of 90es of past age. The First competition on the draft of Russian Venture fund the companies "VTB Control asset", "Bioprocess capital" and Tamir Fishman together with Russian partners have won [8].

The Second project is the creation of open join-stock company "Russian investment fund of information-communication technology" (RIFICT). The state plans to invest 1,4 billions of rubles to created venture fund for investment in IT-branch, and then quotient investors will have to contribute additionally 1,5 billions of rubles during the year. The project provides for first 100 percents of the fund shares will belong to the state, which will sell 51 percents of the shares to quotient investors during the year. By initial intention fund must become completely quotient after 2 years [9].



Russian academy of sciences continues to look for new forms and methods of financing innovation developments. RAS Innovation Policy Coordination Council has discussed the initiative of the creation the fund of development's assistance of small enterprises forms and supported the participation of the RAS scientific divisions in the competition in "START" program aimed at supporting scientific collectives that are able to generate perspectively for the Russian economy ideas and are pressed for funds. The system of the specialized funds should help companies at the early stages of Research and Advanced Development. This duty is still partially performed by the Foundation for Assistance to Small Innovative Enterprises and Russian technology development fund.

A lot of institutes of the Russian Academy of Sciences take part in the innovation projects bid carried out by Russian Foundation for Basic Research together with the Foundation for Assistance to Small Innovative Enterprises. The main challenge of this bid is developing the mechanism of transformation from knowledge to a product by the example of promoting the results of the previously supported fundamental researches conducted by some scientific organizations (generally from the RAS system). While carrying out such projects the researchers not only achieved striking results but also considered the ways of their practical implementation jointly with small businesses operating in the field of high technology products.

The development level of corporative science in Russia is far from the developed countries where it significantly exceeds the state-financed science by the amount of financial sources and the number of scientific personnel. Furthermore, large corporations usually invest heavily in fundamental research including the ones conducted by their own scientific divisions. In the USA a share of large companies in the nationwide fundamental research expenses counts for 25% of the total, and it reaches for 40% in Japan and South Korea [7].

#### **4. Final remarks**

Russia is still at the beginning stage of generating a knowledge-based economy. Among the reasons preventing Russia from more efficient transition to innovative development are the following: broken links between scientific, production, and consumer sectors; absence of developed market relations and consequently fair competition in the sphere of scientific and technical innovation; absence of effective state policy aimed at stimulating and legal provision of innovation activity and the need to develop an infrastructure to support innovation; significant moral and physical depreciation of material and technical foundation of enterprises that are involved in developing and expanding knowledge; inconsistency of the qualifications of managerial personnel with the ability to manage innovation activity, which may produce misunderstandings of the essence and need to increase innovation activity and its effectiveness [10].

To generate elements of innovative economy, to "compress" time frameworks of evolutionary transition to economy based on knowledge, it is necessary to lead deep restructuring of institutional mechanisms that will allow all spheres of economy to function effectively .

At the present moment, innovation policy of the most of the large Russian companies is at the stage of conceptualization and creation. Today it notably bears resemblance to the corporative innovative policy in the developed countries in the 60-70-es of the XX century and characterized by the ambition for quick payback of scientific costs, concentration of human and material recourses primarily for the development of the current technologies and adaptation of the technological innovation gained at the market for the definite manufacture processes, implementation of modern data collection and processing systems. At the same time, the companies obviously realize the unique potential of Russian fundamental science insufficiently. In the nearest future such a situation can become a serious obstacle in the Russian economy transfer to the innovation pattern of development which is to provide high GNP growth rates necessary for a notable increase in the life quality in the country.

One of the successful example of innovation activity's activation is the federal target program "Studies and developments by priority directions of the science and technology development in 2002-2006.", confirmed by RF Government regulation and still being single realized example of private-state partnership, at the same time the volume of quotient facilities, embedded to innovation projects, has exceed the amounts of the budgetary financing: quotient investments to 13 most important innovation projects of state importance have formed 2,77 billions of rubles in 2005, and the state has invested on realization of this project 2,5 billions of rubles. It is expected in future that quotient investments will provide 90,5% of total volume of the means, directed to studies in the framework of the target programs' financing. However this basically concerns large projects [11].

Second stage of strategy in the field of the science development and innovations for the period up to 2010, worked out according to RF government decision, realizes nowadays [12]. Its key tasks are: creation of modern wholeness innovation system, active positioning of the domestic sector of researches and developments in global economy, realization large projects in national priority of technological development in the framework of private-state partnership. It is necessary to note that in the presented document actions and corresponding resources are determined for a period up to 2010, but effects from Strategy's realization carry more long-term character so the estimations for a period up to 2015 are contained in Strategy. The offered Strategy's approach for decision of the system problem will allow:

- to create the base for firm economic growth in fair- and long-term prospect;
- to create the conditions for growth in all economic branches, using results of knowledge-based activity;
- to demonstrate by the example of concrete projects and programs possibilities of economy, founded on knowledge, to raise the quality of "human capital".

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